

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE															
104FM31 BOOT FABRIC ATTACHMENT RING ITEM 104 (1) LEFT (1) RIGHT ----- 10154-04 (2)	2/1R	Loss of primary axial restraint bracket, lower.  Defective material; bracket, retention screws, primary pin missing or loose screws.	END ITEM: Loss of primary axial restraint.  GFE INTERFACE: Axial load will be transferred to secondary restraint bracket.  MISSION: None.  CREW/VEHICLE: None with single failure. Loss of crewman with loss of secondary restraint bracket.  TIME TO EFFECT /ACTIONS: Minutes.  TIME AVAILABLE: Days.  TIME REQUIRED: Hours.  REDUNDANCY SCREENS: A-PASS B-N/A C-PASS	A. Design - The restraint bracket and primary pin are fabricated from 17-4 stainless steel bar stock. The bracket and pin are heat treated to a condition H-1050, ultrasonically cleaned, passivated and either electropolished or dry hone finished. Two threaded 17-4 stainless steel pins are utilized to retain the 17-4 stainless steel pin which has a 16 finish to preclude restraint webbing abrasion.  Tensile testing of the restraint bracket pin demonstrated a minimum ultimate strength of 1640 lbs and a yield strength of 1480 lbs. At 4.4 psid (normal operating pressure) the S/AD limit load is 838 lbs, giving the bracket pin a safety factor of 2.0 for ultimate and 1.8 for yield. At 5.5 psid (max failure pressure) and 8.8 (max BTA operating pressure) the bracket pin provides safety factors for ultimate of 2.7 and 8.5 respectively. The S/AD minimum safety factor for hardware at 4.4 psid is 2.0 for ultimate and 1.5 for yield. At both 5.5 psid and 8.8 psid the S/AD minimum safety factor for hardware is 1.5 for ultimate.  B. Test - Acceptance: Component - See Inspection.  PDA: The following tests are conducted at the boot level in accordance with ILC Document 0111-710112: 1. Proof pressure test at 8.0 + 0.2 - 0.0 psig to verify no structural damage.  Certification: The fabric attachment ring was successfully tested (manned) during SSA certification to duplicate 458 hours operational life (Ref. ILC Report 0111-711330). The following usage, reflecting requirements of significance to the ring, was documented during certification:  <table border="1"> <thead> <tr> <th>Requirement</th> <th>S/AD</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Ankle Flexion/Extension</td> <td>11614</td> <td>24000</td> </tr> <tr> <td>Don/Doff</td> <td>98</td> <td>400</td> </tr> <tr> <td>Pressure Hours</td> <td>458</td> <td>916</td> </tr> <tr> <td>Walking Steps</td> <td>4320</td> <td>77760</td> </tr> </tbody> </table> The Fabric Attachment Ring primary/secondary axial restraint brackets were successfully subjected to an ultimate pressure of 13.2 psig during SSA certification (Ref. ILC Document 0111-711330). This is 1.5 times maximum BTA operating pressure based on 8.8 psi.  C. Inspection - Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provide traceability information.	Requirement	S/AD	Actual	Ankle Flexion/Extension	11614	24000	Don/Doff	98	400	Pressure Hours	458	916	Walking Steps	4320	77760
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		104FM31		<p>During PDA, the following inspection points are performed at the LTA assembly level per ILC Document 0111-710112:</p> <ol style="list-style-type: none"><li>1. Visual inspection for damage, wear or material degradation.</li><li>2. Visual inspection for damage following proof-pressure test.</li></ol> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - None, for every component within its limited life requirement.</p> <p>Every four years or 229 hours manned pressurized time during inspection of the boot, the primary and secondary axial restraint brackets are removed and reinstalled.</p> <p>F. Operational Use - Crew Response - Pre/post-EVA : If not detected, no response. If detected audibly or tactily, troubleshoot problem. If no success, use spare if available or terminate EVA prep. EVA : Single failure not detectable, no response. Special Training - No training specifically covers this failure mode. Operational Considerations - Not applicable.</p>

EXTRAVEHICULAR MOBILITY UNIT  
SYSTEMS SAFETY REVIEW PANEL REVIEW  
FOR THE  
I-104 LOWER TORSO ASSEMBLY (LTA)  
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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Approved by: *[Signature]* 12/24/02  
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